

Abstract of the disclosure.

A dryer bar apparatus of a dryer is disclosed for drying a web in a papermaking machine. The apparatus includes a rotatable dryer shell of cylindrical configuration, the dryer shell having an outer surface for drying the web. The dryer shell has an inner surface which defines an enclosure, the inner surface having a radius R_i . The enclosure is connected to a source of pressurized steam such that in operation of the dryer, a transfer of thermal energy from the steam within the enclosure through the inner surface of the dryer shell to the outer surface of the dryer shell is achieved so that the web is dried. A syphon is disposed within the enclosure for controlling a layer of condensed steam accumulating adjacent to the inner surface of the dryer shell during operation of the apparatus. A number of turbulence bars are disposed within the enclosure, each of the turbulence bars extending in a cross machine direction in contact with the inner surface. The bars are circumferentially spaced equidistantly around the inner surface of the dryer shell for generating turbulence within the layer. The arrangement is such that uniformity of the transfer of thermal energy in the cross machine direction is maximized while the transfer of thermal energy through the dryer shell from the inner to the outer surface is minimized. Also, the number of turbulence bars is determined by the equation:

$$N = \text{int} \{ 2\pi R_i / [4\pi (R_i / \delta)^{1/2} + W] \}$$

in which:

N = the number of turbulence bars in the dryer shell;

int = an integer number of a value in $\{\}$ brackets;

$\pi = 3.1415$;

R_i = the inside radius of the inner surface of the dryer shell in inches;

δ = an average depth of the layer in inches;

W = a width of each of the turbulence bars in inches.